2004 DCID TEHAMA CO. EXTRACTION PERMIT SUMMARY REPORT

APPENDIX A:

TEHAMA COUNTY GROUNDWATER EXTRACTION PERMIT

GROUNDWATER MANAGEMENT OBJECTIVES

GROUNDWATER EXTRACTION AND OFF PARCEL USE

PERMIT NO. WE-03/01

AMENDED MAY 18, 2004

In accordance with Tehama County Code, Title 9, Chapter 9.40. a Groundwater Extraction and Exportation Permit was granted to Deer Creek Irrigation District and is subject to the following conditions:

1. Overdraft of the water table shall not occur.

2. Monitoring of the surface and groundwater systems shall comply with Attachment 1, Amended Groundwater Management Objectives of the project permit application and report.

3. Field measurement of conductivity shall be conducted and evaluated on a monthly basis.

4. Report project status and monitoring results on a monthly basis to the Tehama County Flood Control & Water Conservation AB3030 Technical Advisory Committee.

5. Report project status and monitoring results on a monthly basis to the Tehama County Flood Control & Water Conservation AB3030 Board.

6. During the pumping period, data loggers in Key Wells will record changes in groundwater levels every two-hours, but downloading of data and groundwater level monitoring of the extending grid shall occur monthly.

7. Members of the 2003 Deer Creek Water Advisory Committee membership shall receive monthly updates of project status and monitoring results.

8. The total volume of groundwater extracted shall be limited to a maximum of 550 acre-feet between April and October.

THIS PERMIT IS VOID IF NOT USED WITHIN ONE YEAR FROM DATE OF ISSUE.

Granted MAY 18 2004
DATE

Signed Angela L Ford Deputy
Clerk of the Board, Tehama County Board of Supervisors

2004 GROUNDWATER MANAGEMENT OBJECTIVES For the DCID Groundwater Extraction and Off Parcel Use Permit No. WE-03/01

INTRODUCTION

Deer Creek Irrigation District is located in the lower Deer Creek watershed (see Figure 1). As part of the 2003 Deer Creek Water Exchange Pilot Program, DCID was granted a Groundwater Extraction and Off Parcel Use Permit WE-03/01 for operation of the newly installed deep-aquifer production well. In 2004, DCID proposes to operate the test-production well solely for the purposes of augmenting agricultural water supply within the DCID service area. Operation of the pilot program will follow the amended conditions set forth in the Tehama County Groundwater Extraction and Off Parcel Use Permit (WE-03/01) and the amended guidelines set forth in the Groundwater Management Objectives listed below. The Groundwater Management Objectives utilize groundwater level and groundwater quality data to establish a clear set of criteria for pumping operations.

The overall management goals of the Deer Creek Irrigation District are to maintain the groundwater surface elevation at a level that will assure an adequate and affordable irrigation water supply, and to assure a sustainable supply of good quality groundwater for agricultural and domestic use. In order to maintain this goal, it is recognized that the operational criteria presented in the Groundwater Management Objectives may need to be adjusted as additional operational data for the program are established.

PROGRAM COORDINATION and INSTITUTIONAL AUTHORITY

Deer Creek Irrigation District is signatory to the Tehama County AB 3030 Groundwater Management Plan. The Tehama County AB 3030 Groundwater management Plan is administered by the Tehama County Flood Control and Water Conservation District (TCFCWCD). The TCFCWCD has established a Technical Advisory Committee (AB 3030 TAC) that serves as an advisory body to the TCFCWCD Board. The TCFCWCD Board and the AB 3030 TAC hold monthly meetings to implement the AB 3030 plan, and to develop policy on local groundwater management issues.

Tehama County also administers several groundwater-related ordinances. Chapter 9.4, "Aquifer Protection", of the Tehama County Code incorporates County Ordinance No. 1617. Tehama County Ordinance No. 1617 requires a permit to extract groundwater for the purpose of using or selling the water for use on lands other than the parcel from which the extraction occurs. Permitting authority of this ordinance is through the Tehama County Board of Supervisors (BOS), but administration of the permitting process is through the Tehama County Health Agency, Environmental Health Division (EHD). The EHD also oversees permitting associated with drilling and installation of all new wells.

With respect to operation, monitoring and reporting of DCID's groundwater pumping associated with Tehama County Permit WE-03/01, primary coordination and reporting will be through the Tehama County HED, via the Board of Supervisors. Secondary coordination at the county level will be through the AB 3030 TAC, via the TCFCWCD. At the local level, coordination will be

through the Deer Creek Watershed Conservancy, the DCID Board and through stakeholder meetings associated with ongoing planning of the Deer Creek Water Exchange Program.

During operation of the 2003 Deer Creek Water Exchange Pilot Program, a Deer Creek Water Advisory Committee (WAC) was established. The WAC helped oversee the development and compliance of the program, interface with the local, county and State representatives, and work towards a more compressive groundwater management plan for the Deer Creek watershed.

The 2003 Deer Creek WAC included representatives from each of the following entities.

- Deer Creek Irrigation District,
- Tehama County AB 3030 TAC,
- Tehama County Health Agency, EHD
- Northern District Department of Water Resources,
- California Department of Fish and Game,
- UC Davis Agricultural Extension Farm Advisor,
- Private groundwater users outside DCID and SVRIC area, but within the lower Deer area.

The 2003 Deer Creek Pilot Program WAC proved valuable for providing program input and dispensing information to local, county and state groups. In the 2004 pumping program, the WAC participants from the 2003 program will be informed of program operations and provided monitoring data on a monthly basis, but due to the lack of impacts associated with the 2003 pumping, it is not envisioned that it will be necessary to convene this group. Official reporting and annual program review associating with the permitting process for the pilot program will coordinated directly with the Tehama County Health Agency EHD.

GROUNDWATER LEVEL CRITERIA

One of the key criteria for program operations is maintaining a predetermined range of acceptable groundwater levels surrounding the test-production well. The acceptable range of groundwater level fluctuation during program operations was established based on historic groundwater level data and the estimated worse-case decline in groundwater levels associated with test-production well pumping. The predetermined range of acceptable groundwater level fluctuation has been reviewed and is supported by the DCID Board. Operation of the test-production well will proceed as long as there is compliance with the pre-agreed groundwater level criteria. The groundwater level monitoring location, timing, data reporting, acceptable range of fluctuation during program operations, and procedures for noncompliance determination, evaluation and program shutdown are presented below.

Groundwater Level Monitoring Network

Figure 1 shows the lower Deer Creek groundwater level monitoring network and identifies the location of the active monitoring wells (existing irrigation & domestic wells), as well as, the location of dedicated monitoring wells.

Monitoring Well Numbering System

All wells participating in the pilot program will be numbered according to the California State Well Numbering System as illustrated in Figure 2.

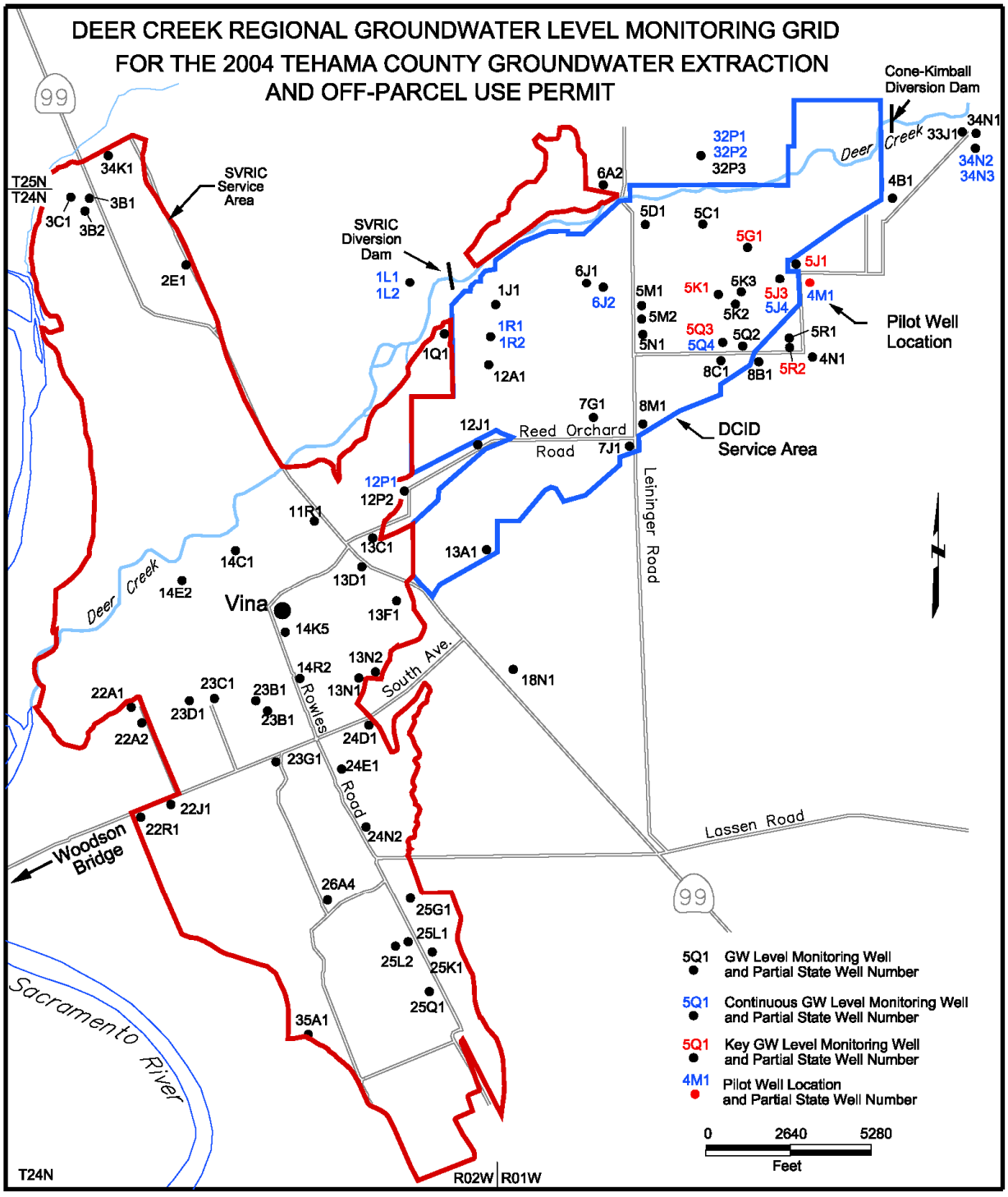

Figure 1. Deer Creek Regional Groundwater Monitoring Grid.

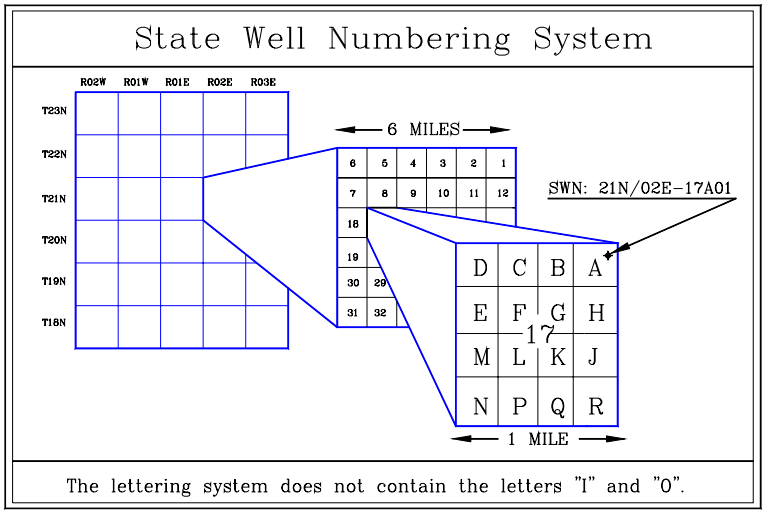

Figure 2. California State Well Numbering System.

Key Groundwater Level Monitoring Wells
Groundwater levels in key monitoring wells will be used to monitor compliance with the predetermined range of acceptable groundwater level fluctuation identified in the groundwater criteria below. Figure 3 shows the location of the seven key wells that will be used to evaluate compliance with the groundwater level criteria. The key wells were selected based on their construction, proximity to the pilot well, and their ability to represent groundwater levels in surrounding agricultural and domestic wells drawing from the upper Tuscan aquifer.

Groundwater Level Measurements
The Department of Water Resources will be responsible for monitoring groundwater levels during operation of the pilot program. Some of the monitoring wells in pilot program are also part of the summer Tehama County groundwater level monitoring grid. Tehama County will likely also measure groundwater levels in these wells during their regular summer monitoring schedule.

Frequency of Groundwater Level Measurements
Monitoring frequency will vary depending upon monitoring well location and type, and the program operations schedule.

During Periods of Non-Pumping : During non-program operations, the depth to groundwater will be measured in all wells within the Deer Creek monitoring grid at a minimum frequency of three times per year, according to the following schedule.

- Spring: (March or April)
- Summer: (July or August)
- Fall: (October)

In addition to the above monitoring, during periods of non-program operations, the seven key wells and the remaining dedicated monitoring wells within the Deer Creek monitoring grid will be equipped with automated groundwater level recording equipment. The automated equipment will be set to measure groundwater levels at a minimum

frequency of six times per day. The data from this equipment will be downloaded a minimum of three times per year during non-pumping periods, according to the above schedule.

During Periods of Test-Production Well Pumping: During test-production well pumping, the depth to groundwater will be measured in the Deer Creek monitoring wells that are east of Highway 99, at a minimum frequency of once per month between April and October.

In addition to the above monitoring, during periods of program operation, the seven key wells and the remaining dedicated monitoring wells within the Deer Creek monitoring grid will be equipped with automated groundwater level recording equipment. The automated equipment will be set to measure groundwater levels at a minimum frequency of twelve times per day. The data from this equipment will be downloaded once per month between April and October, and every other month from November through March.

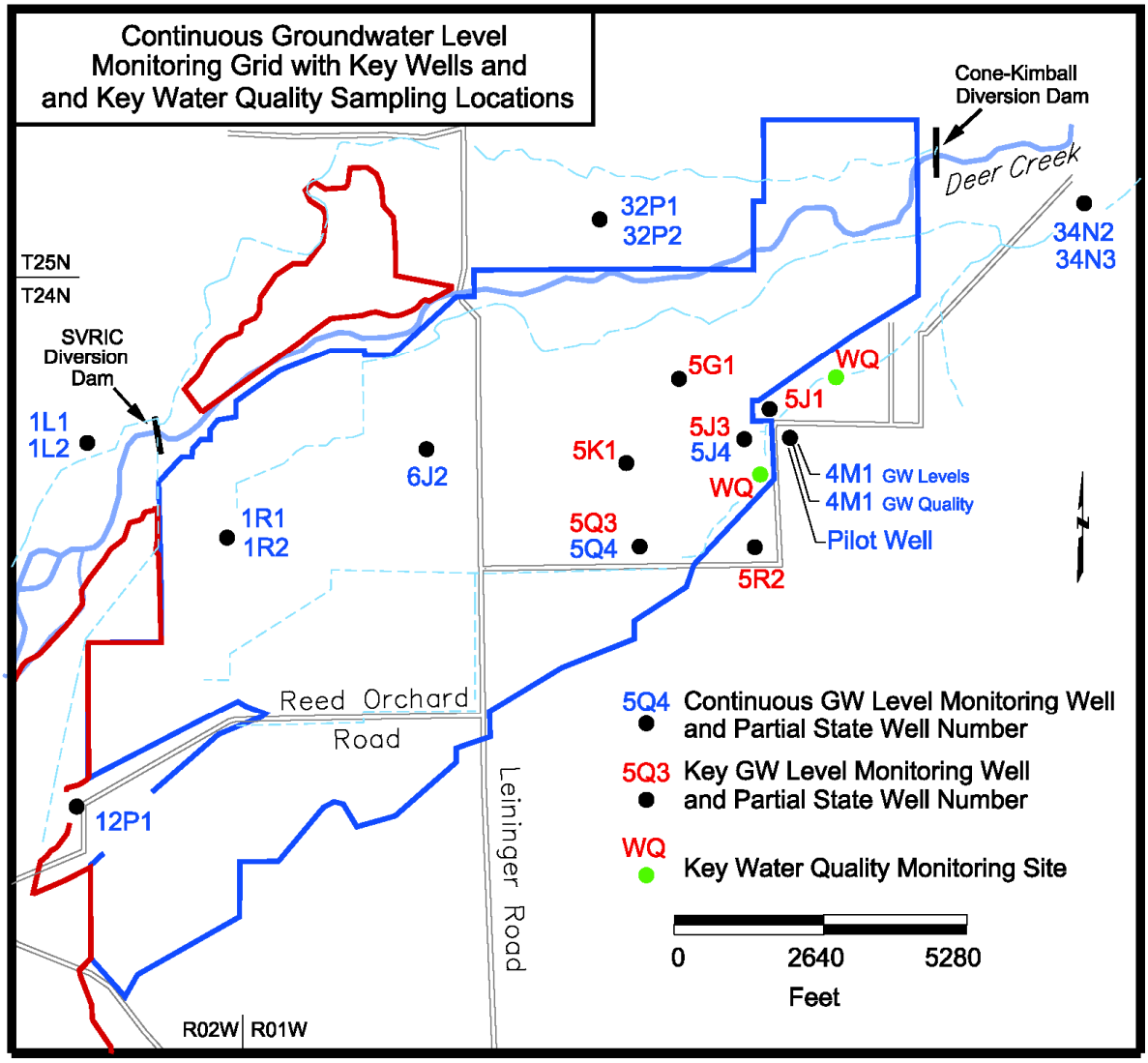

Figure 3. Key GW Level Monitoring Wells and Water Quality Sampling Locations.

Key Monitoring Wells State Well Number	Well Use	Aquifer Production Zone	Total Depth (feet)	Perforation Interval (feet)
24N01W-05J01	Cemetery Well	Upper Tuscan	178	58-178
24N01W-05R02	Domestic	Upper Tuscan	160	118-160
24N01W-05J03 (MW 2s)	Monitoring Well	Upper Tuscan	385	271-385
24N01W-05Q03 (MW 3s)	Monitoring Well	Upper Tuscan	415	280-415
24N01W-05G01	Idle Irrigation	Upper Tuscan	490	130-490
24N01W-05K01	Idle Irrigation	Upper Tuscan	260	27-260

Table 1. Key Well Construction and Use.

Acceptable Range of Groundwater Level Fluctuation During Pumping Periods

The acceptable range of groundwater level fluctuation during test-production well pumping was estimated for the seven key monitoring wells that are shown in Figure 2. These ranges are based on static water level readings and were developed based on:

- review of the historic seasonal fluctuation of groundwater levels in domestic and agricultural wells surrounding the pilot program well,
- the estimated decline in surrounding groundwater levels in domestic and agricultural wells associated with pumping of the pilot well, and
- the ability of nearby third-party groundwater users to maintain an adequate and affordable supply of good quality groundwater for agricultural and domestic use.

In order to have adequate time to respond and make appropriate adjustments to program operations, the range limits are divided into a series of three warning stages. Each warning stage corresponds to a progressive increase in the decline in groundwater levels, and represents further movement towards noncompliance with the groundwater level criteria and eventual shutdown of program operations. Each warning stage also triggers a sequence of program management review and actions designed to alleviate any additional groundwater level decline.

Definition of Groundwater Level Warning Stages

The warning stages are based on static water level readings. The warning stages were develop by the DCID board, and have been reviewed by the Pilot Program WAC during the 2003 Pilot Program operations. The warning stages are subject to approval the Tehama County BOS through the permitting process for Tehama County Ordinance No. 1617. It is understood that adjustments to the warning stage criteria may be needed as data is collected during the pilot program. Procedures for adjustment to a warning stage will be similar to the initial development of the warning stage(s).

The historic groundwater level data along with the three warning stages for the seven key wells are presented in Figures 4 through 10. Stage 1, Stage 2 or Stage 3 warnings will be issued by the groundwater level monitoring staff when the measurements indicate that the following criteria have been met.

- Stage 1 Warning will be declared when the static groundwater level in any of the Key Wells falls below the Stage 1 warning line.
- Stage 2 Warning will be declared when the static groundwater level in any of the Key Wells falls below the Stage 2 Warning line.
- Stage 3 Warning will be declared when the static groundwater level in any of the Key Wells falls below the Stage 3 Warning line.

Upon recommendation of the DCID and approval of the Tehama County BOS, a Stage 1 and Stage 2 Warning may be rescinded when the groundwater levels rise above the corresponding Stage 1 Warning Line in the non-compliant Key Well(s).

Upon recommendation of the DCID and approval of the Tehama County BOS, the Stage 3 Warning may be rescinded when the groundwater levels rise above the Stage 2 Warning Line in the non-compliant Key Well(s). A Stage 3 Warning may also be temporarily downgraded to a Stage 2 Warning if, after review of all of the groundwater level data, the affected landowners, the DCID Board, and the Tehama County BOS unanimously agree to the temporary downgrade.

Evaluation for Compliance with Groundwater Level Criteria
Following each monitoring period, the Department of Water Resources will evaluate the groundwater level data for determination of compliance with the groundwater level criteria as stated in the Groundwater Management Objectives and shown in the Key Well Figures 4 through 10.

Compliance Reporting and Groundwater Level Data
During periods of test-production well pumping, the Department of Water Resources will make groundwater level data available over the internet within 10 days of each monitoring period. The data will provide Key Well hydrograph data and indicate compliance or non-compliance with warning stage trigger levels.

If wells are found to be in noncompliance with the groundwater level criteria, a noncompliance report will be submitted by the Department of Water Resources to the DCID Board and the Tehama County EHD within 7 days of the last monitoring period. The noncompliance report will include information as to the regional extent and magnitude of the noncompliance and the character of the compliance violation (Stage 1, 2 or 3 Warning Level).

Response Action for Noncompliance with Groundwater Level Criteria
A series of response actions for each warning level are listed below. The intent of the following list is to provide a minimum level of required response actions, thereby maintaining flexibility for further action, as needed and appropriate, to maintain the general program goals of sustaining the groundwater resource while minimizing third-party impacts. Therefore, the magnitude and extent of possible response actions shall not be limited to those identified below:

Stage 1 Warning - Stage 1 response actions shall include remeasuring groundwater levels and reassessing the appropriateness of the GMO groundwater level criteria with respect to the given circumstances. The Department of Water Resources shall collect and present all pertinent hydrological data to the DCID Board, the EHD and the Tehama County AB 3030 TAC for review. The DCID and DWR shall investigate possible causes for the noncompliance, and develop recommend actions to resolve the Stage 1 noncompliance. These recommendations shall be made in a timely manner not to exceed 7 days after the reporting of the Stage 1

noncompliance. It shall be the intent of the review group to first make recommendations that focus on resolving the noncompliance through management actions and negotiations with all parties in the affected area. Additional action to help identify the cause for the noncompliance may include, but not be limited to, increasing the frequency of groundwater monitoring and re-assessing the existing appropriateness of the GMO groundwater level criteria.

Stage 2 Warning - Stage 2 response actions shall include more extensive monitoring and evaluation of the GMO groundwater level criteria with respect to the given circumstances. The Department of Water Resources shall collect and present all pertinent hydrological data to the DCID Board, the EHD and the Tehama County AB 3030 TAC for review. The DCID and DWR shall investigate possible causes for the noncompliance, and develop recommend actions to resolve the Stage 2 noncompliance. These recommendations shall be made in a timely manner not to exceed 7 days after the reporting of the Stage 2 noncompliance. Depending upon the circumstances surrounding the Stage 2 noncompliance, actions at this time could include shutting down the pilot program well if a Stage 3 noncompliance appears imminent. If the progression of groundwater levels towards a Stage 3 noncompliance appears slow or unlikely, other operational management methods may be implemented to avoid further decline of groundwater levels. The methods may include, but not be limited to, partial shutdown of the pilot well during periods of peak interference with surrounding pumping wells, reduction in the volume of daily groundwater extraction from the pilot well or voluntary water conservation measures. Implementation of Stage 2 management actions may require action by the Tehama County BOS.

Stage 3 Warning - Stage 3 management actions shall consist of terminating the groundwater pumping associated with the pilot program and collecting groundwater level recovery data in the surrounding wells. Groundwater level recovery data will be collected by the Department of Water Resources and presented to the DCID Board, the EHD and the Tehama County AB 3030 TAC for review. The DCID and DWR shall investigate the recovery from Stage 3 noncompliance levels, and develop recommend actions as to further program operation.

Supporting Data
When possible, groundwater level and groundwater quality data from surrounding Tehama County areas will be used to support evaluation of existing conditions in the DCID area.

GROUNDWATER QUALITY CRITERIA

Maintaining a minimum level of acceptable water quality from the pilot program pumping well is the second criteria for program operation. The water quality criteria will require that groundwater from the test-production well will be maintained above the Maximum Contaminant Level (MCL) established for agricultural use in the United States by the Food and Agriculture Organization of the United Nations. For some minerals and nutrients, no agricultural MCL's have been established. In these situations, water quality from the pilot well will be maintained at level that is equal to, or better than, the existing quality of surface water that is currently being diverted. The water quality standards for agriculture are listed in Table 1.

The range of acceptable groundwater quality has been reviewed and is supported by the DCID Board. Operation of the pilot program will proceed as long as there is compliance with the pre-agreed to groundwater quality criteria. The location and frequency of groundwater quality monitoring, the reporting of the data, and management action for noncompliance are presented below and has been adjusted from previous monitoring objectives based on the results of the

2003 monitoring which indicated that the quality of water from the production well is of high quality.

Water Quality Monitoring Network
Figure 2 shows the water quality monitoring network and identifies the location of the surface and groundwater monitoring sites. All wells participating in the pilot program are numbered according to the California State Well Numbering System illustrated in Figure 2.

Key Water Quality Monitoring Sites
Three key water quality monitoring sites will be used to monitor compliance with the water quality criteria.

- Site 1: Sample and test surface water quality in the distribution system, above the point where groundwater from the pilot well discharges into the system.
- Site 2: Sample and test the groundwater quality as it discharges from the pilot well.
- Site 3: Sample and test the surface water quality in the distribution system below the point where groundwater from the pilot well discharges into the system.

Water Quality Sampling and Testing
The Department of Water Resources will be responsible for field collection and testing of surface and groundwater quality samples. Analytical testing will be conducted at a State of California approved laboratory and will include analysis for minerals, trace metals and nutrients. Minerals analysis will include testing for conductivity, pH, temperature, alkalinity, total dissolved solids, total hardness, boron, calcium, chloride, magnesium, potassium, sodium and sulfate. Trace metal analysis will include testing for aluminum, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium and zinc. Nutrient analysis will include testing for ammonia, dissolved orthophosphate, nitrite, nitrate, and total phosphorus.

Parameter	Aluminum	Arsenic	Boron	ASAR [2]	Cadmium	Chloride	SC [3]	TDS [4]
Ag. MCL [1] (mg/l)	5.0	0.1	0.7	< 3	0.01	106	0.7	450
Parameter	**Manganese**	**Copper**	**Nickel**	**Iron**	**Selenium**	**Lead**	**Zinc**	
Ag. MCL [1] (mg/l)	0.2	0.2	0.2	0.3	0.02	5.0	2.0	

1. MCL = Agricultural Maximum Contaminant Level
2. ASAR = Adjusted Sodium Absorption Ratio
3. SC = Specific Capacity measured in micro-mhos/cm
4. TDS = Total Dissolved Solids

Table 1. Agricultural Water Quality Standards Established by Food and Agriculture Organization of the United Nations.

Frequency of Water Quality Monitoring
Based on the 2003 data indicating that the quality of water from the test-production well was of high quality, future samples will well collected: once within 5 days of the start of the test-production well pumping and once within 5 days of the conclusion of the pumping. In addition, field measurements of electrical conductivity will be conducted monthly. Following each monitoring period, the Department of Water Resources will evaluate the surface and groundwater water quality data for compliance with the MCL's for agricultural use as listed in Table 1.

Compliance Reporting of Water Quality Data

During program operations, the Department of Water Resources will provide the analytical results from the water quality testing over the Internet within 10 days of receiving the data from the lab, and within 7 days of the monthly field sampling date. In addition, status reports will be provided to Tehama County EED and AB 3030 TAC, as well as the 2003 WAC. Each report will provide a comparison of recently measured water quality data against the agricultural MCL's. .

Response Action for Noncompliance with Water Quality Criteria

If water quality data is above the recommended agricultural standards presented in Table 1, the Department of Water Resources will submit to the DCID Board, the EHD and the Tehama County AB 3030 TAC recommend actions to improve water quality. The recommended corrective actions will vary depending upon which water quality parameters are exceeding the agricultural MCL. Corrective actions may include, but not be limited to, mixing of poor quality water with water of a higher quality, treatment of the poor quality water or termination of pumping from the pilot well.

ANNUAL REPORTING

An annual report will be prepared in the fall at the conclusion of the groundwater pumping. The annual report will summarize the status of groundwater levels and water quality for the DCID project area over the past year, compliance or non-compliance with groundwater management objectives of the pilot water exchange program, evaluation of the program and recommendations for improvement.

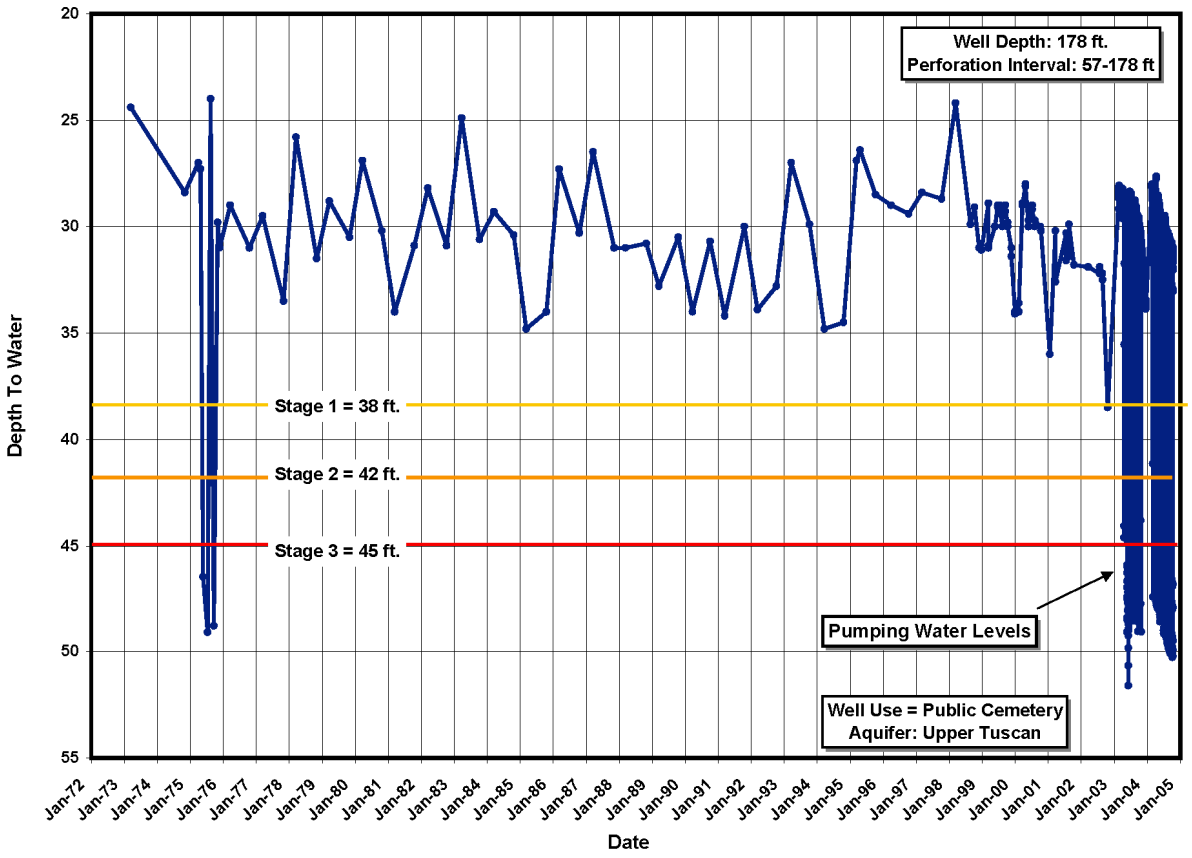

Figure 4. Static Groundwater Level Stages for Key Well: 24N/01W-05J01

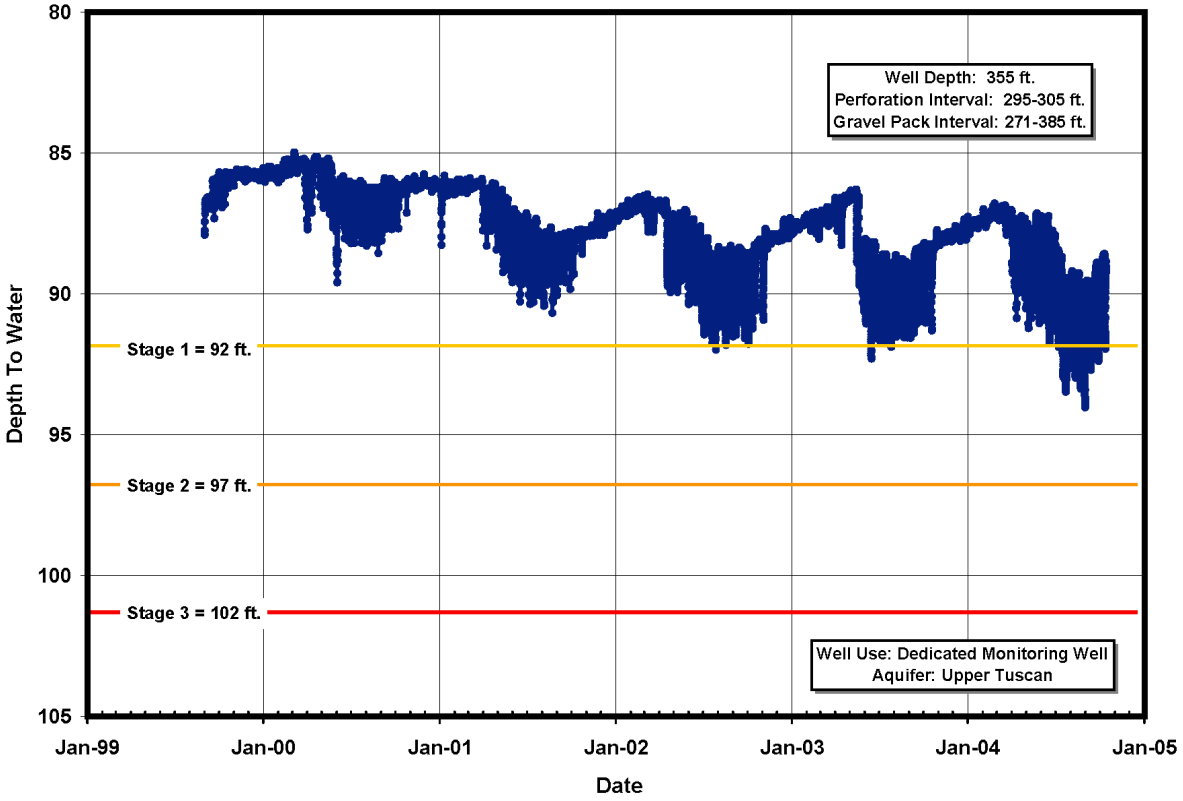

Figure 5. Static Groundwater Level Stages for Key Well: 24N/01W-05R02

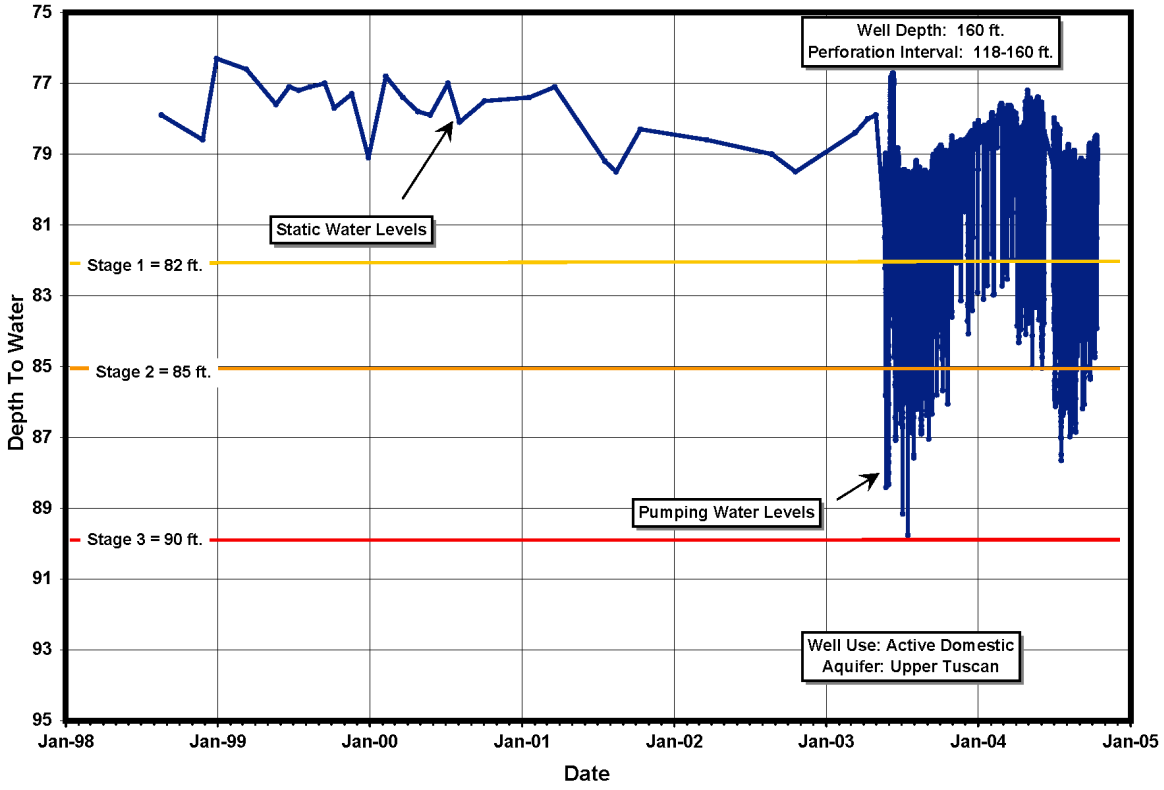

Figure 6. Static Groundwater Level Stages for Key Well: 24N/01W-05J03 (MW 2s)

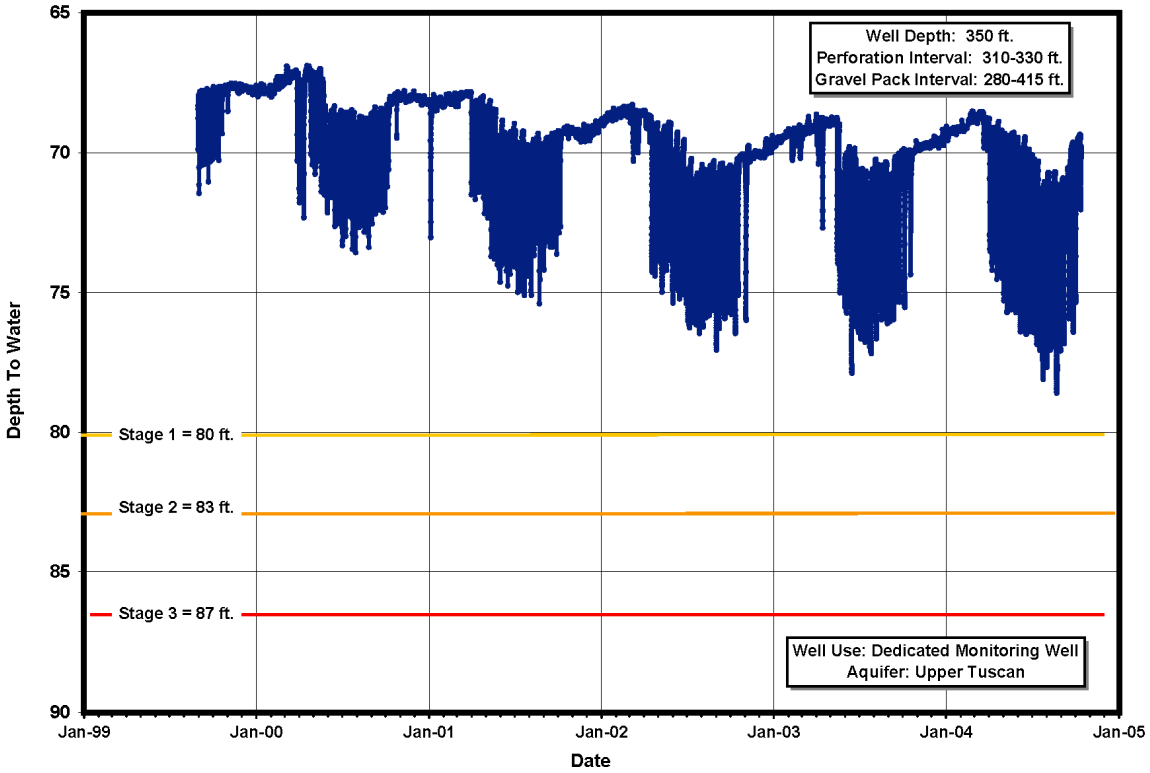

Figure 7. Static Groundwater Level Stages for Key Well: 24N/01W-0Q03 (MW 3s)

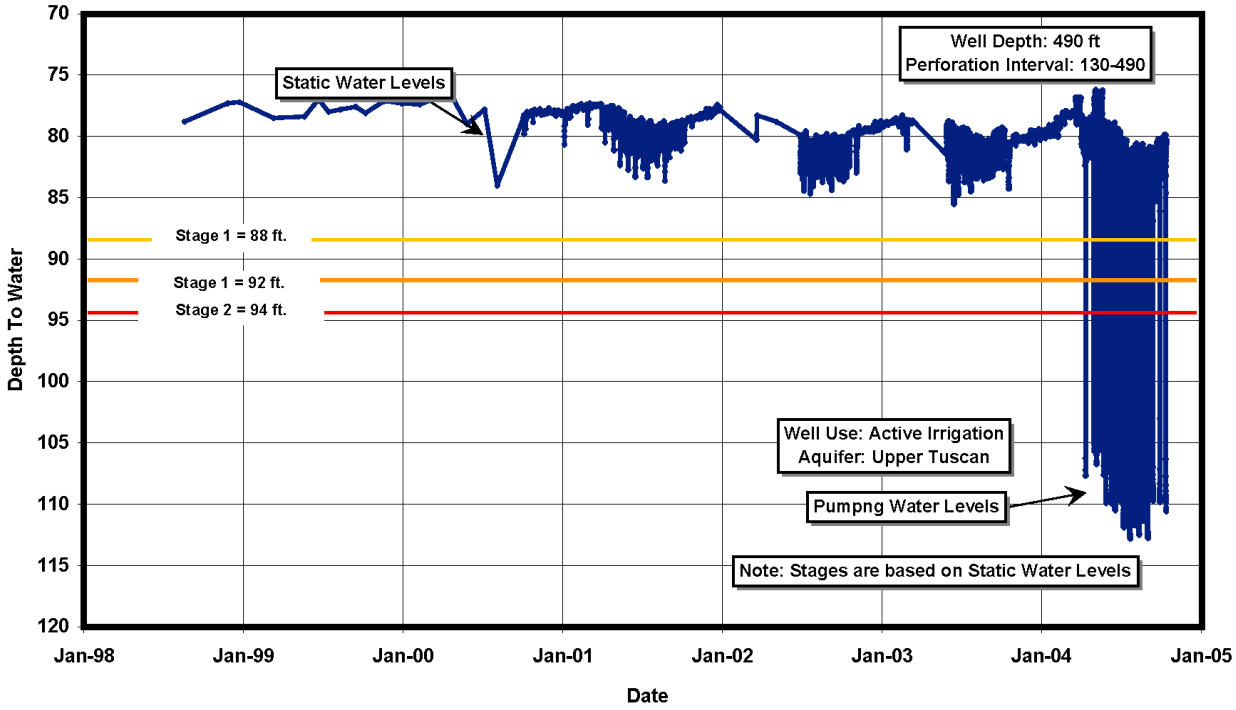

Figure 8. Static Groundwater Level Stages for Key Well: 24N/01W-05G01

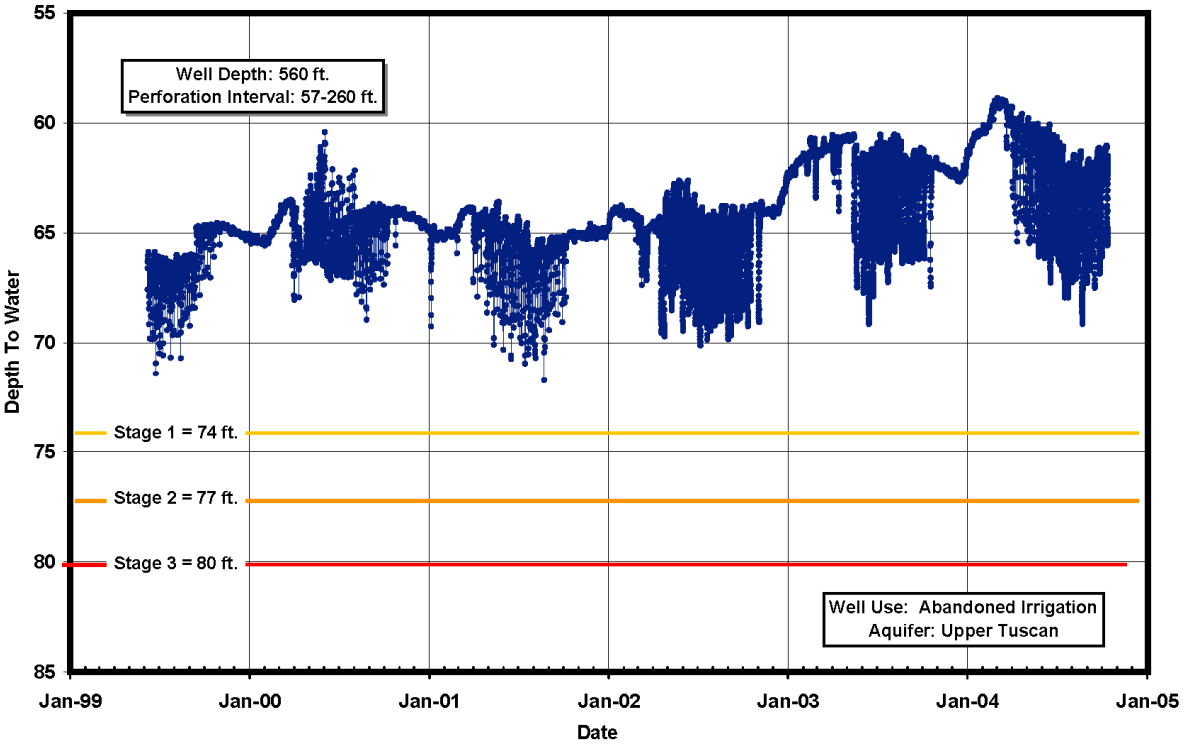

Figure 9. Static Groundwater Level Stages for Key Well: 24N/01W-05K01